DESCRIPTION: HEIL OIL WATER SEPARATOR SYSTEM, GEAR PLANT

The Heil Oil Water Separator Treatment System [HEIL] is a central oil/water separation treatment for all known or suspected oily wastewater discharges from shop process and support functions within the Gear Plant building complex, on the southern most parcel of GE property at the Lynn Site. This facility removes grease, oil, other petroleum derivatives and settleable contaminants from the wastewater to a level acceptable for discharge to the Lynn Water and Sewer Commission (LWSC) POTW at the Commercial Street Outfall.

Wastewater discharge from gear manufacturing and testing facilities is primarily the result of coolant mixed with cooling water, steam condensate and some groundwater that accumulates in subgrade depressions (or pits) under huge grinding, boring, and polishing equipment within the shop floor manufacturing process. This mixture is further contaminated with way oils, lube oils, and hydraulic fluids over time. Each of these accumulation sites has been identified and is plumbed to transfer the oily wastewater to a central collection point – the "four-compartment subgrade separator" in Bay 15, at the southeast corner of the building.

The four-compartment subgrade separator is a custom built metal tank of approximately 1100 gallons with four vertically configured chambers, created by two vertical transect metal walls each bisecting two opposing tank walls (the north wall and south wall; and the east wall and west wall, respectively). This creates four chambers, which can be labeled NE, NW, SE, and SW. All contaminated wastewater is received into the SE chamber. Separation is accomplished with a series of under/over weirs between the chambers that force light phases to flow over and aqueous phases to flow under, thereby accomplishing the first rough-cut separation. Water flows from SE to NE and then to NW and is then pumped to the Heil OWS influent chamber. Oil flows from SE to SW and is then pumped to an oil purification and recycling system within Bay 15.

The oil water separation treatment takes place in the approximately 2,000-gallon Heil OWS. Oily wastewater is transferred to the influent chamber at the North end of the OWS. General flow is south through the center, quiescent chamber which is equipped with a corrugated coalessor plate pack (38"x42"x58") designed to aid in separation of light phase, aqueous and settable solid phases. Flow continues south, under a deep weir to the effluent chamber. From here, the treated wastewater spills over the final reverse weir to the north, and into the effluent channel connected to the discharge pipe to the Outfall. Light phase is skimmed from the surface of the quiescent chamber and flows by gravity to the oil purification and recycling system within Bay 15.

A polishing unit (not required by permit) was voluntarily added to the system, consisting of series of simple oleophilic filtering devices. The objective of this final treatment step is to minimize the concentration of oil and grease in the discharge. The discharge goal is 30% of the oil and grease concentration at the Commerce Street Outfall. This treatment is voluntary and while approved by LWSC, it is not required by the permit. The polishing unit may be removed from the treatment train with the approval of the Water Programs Lead [WPL] for routine maintenance, including filter bag change outs. In rare circumstances, the EHS WPL may authorize full bypass of the polishing unit, for required maintenance or emergency events.

The design capacity of the current major Heil equipment is as follows:

- ***Wastewater Collection compartment subgrade separator*** - Wastewater flows to a 5 ft L x 5 ft W x 5.83 ft H "four-compartment subgrade separator" (approximately 1,000 gallons) located in Bay 15, in the southwest corner of the Gear Plant. Pump level controls are currently set to transfer partially treated wastewater only to the Heil OWS.
- ***Two Progressive Cavity Pumps*** - Wastewater is pumped from the "four-compartment subgrade separator" using two pumps (each rated at about 37 gpm); one dedicated to oil and the other to water transfer.
- ***Two Oil/Water Separators*** – The Heil is a coalescer type separator rated for well over the current 40-gpm flowrate. Wastewater is pumped to the influent chamber of the OWS, at the north end of the unit. Treated water flows by gravity to the combined sanitary /industrial wastewater sewer system.
- ***Oil Storage Tank*** – Reclaimed oil is pumped to a centrifugal purifier then to an oil storage tank for re-introduction to the shop process as needed. Product is collected in oil storage tanks (45" ∅ x 119" long) with a capacity of about 800 gallons is located within an approximately 1400-gallon containment dike. The tank is inspected weekly by the on-site hazardous waste contractors.
- ***Final Polishing Treatment*** -The skid-mounted final treatment consists of a 24 GPM pump, a 200-gallon head tank, and a filter housings with series 529A filter bags. This treatment is voluntary and while approved by LWSC, is not required by the POTW permit.